

TECHNICAL NOTES¹

SURVEY UNIVERSE

The data collected in the fall 1998 Survey of Graduate Students and Postdoctorates in Science and Engineering represent national estimates of graduate enrollment and postdoctoral employment at the beginning of academic year 1998–99 in all academic institutions in the United States that granted doctorate or master’s degrees in any science or engineering field. Included are data for all branch campuses, affiliated research centers, and separately organized components such as medical or dental schools, schools of nursing, public health, etc. The survey universe consisted of 722 reporting units at 601 graduate institutions. Included were 249 master’s-granting institutions and 473 reporting units associated with 352 doctorate-granting institutions.

The National Science Foundation (NSF) has collected data on graduate science and engineering (S&E) enrollment and postdoctoral appointees since 1966. From fall 1966 through fall 1971, data from a limited number of doctorate-granting institutions were collected through the NSF Graduate Traineeship Program, which requested data only on those S&E fields supported by NSF. Beginning with the fall 1972 survey, this data collection effort was assigned to NSF’s Universities and Nonprofit Institutions Studies Group and was gradually expanded from 1972–75 to include additional S&E fields as well as all institutions known to have programs leading to a master’s or doctoral degree. Due to this expansion, data for 1974 and earlier years are not strictly comparable with 1975 and later data. Technical table 1 shows the number of institutions, reporting units, and departments at each level included in the data, as well as the total enrollment reported for each year between 1966 and 1998. No attempt has been made to inflate the data for 1966–74 to reflect universe totals.

Beginning with the 1984–85 academic year, master’s-granting institutions were surveyed on a sample basis. From 1984–87 the survey design was a stratified random sample, with all doctorate-granting institutions, all master’s-granting historically black colleges and universities, and all land-grant institutions included in the certainty stratum. The remaining master’s-granting institutions were divided into two sample strata on the basis of

enrollment size. Data for sampled institutions for the years 1984–87 were reestimated in 1988 on the basis of 1983 and 1988 data. During the 1989 survey cycle, S&E field definitions were reviewed and some departments were deleted. Data for 1975–88 were adjusted to conform to the revised definitions.

The fall 1988 survey included the entire survey population for the first time since 1983–84. Since 1988, any institutions starting up S&E master’s or doctoral programs have been added to the survey universe, and any that have closed all their S&E graduate programs have been deleted. (See Survey Methodology, below.)

Technical tables 2 and 3 present data on departmental coverage by S&E field for doctorate- and master’s-granting institutions for the last 8 years surveyed.

SURVEY INSTRUMENTS

The survey questionnaire on which data were reported in fall 1998 was identical to that used in fall 1997. In addition to the questionnaire proper, each survey package also included the following:

- an enclosure detailing mailing package contents;
- a flyer explaining NSF’s academic S&E surveys;
- cover letter to survey coordinators at graduate schools or at medical schools;
- cover letter to departmental respondents;
- a computer-generated List of Departments or Programs (NSF Form 811) specific to each institution surveyed and based on the departments known to exist in the previous survey cycle;
- a “crosswalk” showing National Center for Education Statistics instructional program codes corresponding to each S&E field as defined by NSF;
- a “How to Avoid Common Survey Errors” sheet with guidelines for avoiding the most common mistakes made in the graduate student survey;

¹See <http://www.nsf.gov/sbe/srs/sgss/start.htm> for a more detailed discussion of the methodology used in this survey.

- a postcard for respondent use acknowledging receipt of the survey and indicating any changes in coordinator name, address, telephone number, or e-mail address;
- a “Web-Based Data Reporting System” announcement introducing and explaining the new Web system, which allows coordinators and departments to enter data directly into the system through the Internet;
- an “ID and Password” flyer informing coordinators of their IDs and passwords so they can access the new NSF-NIH Graduate Student Survey Web-Based Data Reporting System; and
- an “Accessing NSF Data on the Internet” sheet encouraging coordinators to view last year’s data on the Web via the NSF Science Resources Studies home page.

SURVEY METHODOLOGY

The survey packages were mailed out by November 30, 1998. This was the first year in which schools had the option of reporting data using the new NSF-NIH Graduate Student Survey Web-Based Data Reporting System. Two hundred and sixteen schools chose to report data using the new Web system. The final survey universe consisted of 722 reporting units at 601 institutions.

In addition to the verification information cited above, the acknowledgment postcard also requested that institutional coordinators indicate how the data were collected, whether the data were maintained centrally or collected from individual departments, and whether they were derived from a computerized database or hand tabulated. Of the 722 reporting units surveyed, 98.9 percent have provided this information over the past 10 years. The majority of schools report a combination of sources for their data. Over the years, the use of computerized systems has shown a gradual but small increase, while the use of hand tabulation has slowly decreased.

Institutional coordinators were asked to review the departmental listing provided in the survey packet and to indicate any changes in their departmental structure such as departments newly formed, phased out, split, or merged; they were also asked to check off any departments that had neither graduate students nor

postdoctorates and for which survey questionnaires would therefore not be submitted. The revised Form 811s were returned to NSF’s data processing contractor for use as a checklist in tracking departmental responses.

A survey questionnaire was completed for each department either centrally or at the department level and was returned to the data processing contractor for data entry, editing, and tabulation. Arithmetic errors, inconsistencies between items, and sharp year-to-year fluctuations were referred to the institutional coordinators for correction or clarification.

RESPONSE RATE

Of the 722 reporting units included in the fall 1998 survey, 721—or 99.9 percent—were able to provide at least partial data, distributed as follows:

At the departmental level, 11,528 departments responded, or 98.4 percent of the 11,718 departments surveyed. Of these, 9,822 departments, or 83.8 percent of the total, provided complete responses. A total of 190 departments, or 1.6 percent of the departmental total, required complete imputation; 1,706, or 14.6 percent, had one or more data cells imputed. Technical table 4 presents the department response rates for earlier years for comparison.

Missing data for partially nonrespondent departments were imputed using the departments’ previous year’s data, where available, or data from peer institutions in cases where data had not been reported the previous year. Data for nonrespondent departments (those that did not provide any data) were imputed using data from the previous year, where available. The number of departments in doctorate- and master’s-granting institutions that required total or partial imputation, and the numbers and proportions of full- and part-time graduate students and postdoctorates imputed, are shown in technical tables 5 and 6. Imputation rates by survey data item are provided in technical table 7.

CHANGES IN DATA ITEMS

Although NSF has attempted to maintain consistent trend data, some modifications in the survey questionnaire have been made to respond to changing issues over the past 25 years. As a result, some data items are not available for all institutions in all years.

Major changes in the data collected are as follows:

- From 1975-77, data for master's-granting institutions were collected on a short form (i.e., an abbreviated form of the survey) that did not collect data on sex or citizenship of graduate students, nor any data on postdoctoral appointees. In 1978, a similar questionnaire was sent to doctorate-granting institutions; master's-granting institutions were not surveyed that year. This 1978 questionnaire did not collect data on mechanisms of support for full-time students. All mechanisms of support data for that year were combined on one line and appear as "other types of support" in any data tables. The 1978 figures shown in the tables for master's-granting institutions represent estimates based on 1977 and 1979 data. Beginning in 1979, the full-scale survey form was sent to both doctorate- and master's-granting institutions.
- Distribution by sex was originally requested only for full-time graduate students at doctorate-granting institutions. Beginning in 1976, master's-granting institutions were also asked to provide data on all graduate students by sex; in 1977, similar data were requested for all graduate students in all institutions. The short form used in 1978 did not request any information on sex; figures in the tables represent estimates based on 1977 and 1979 data.
- Citizenship data were collected only for graduate students enrolled full time in doctorate-granting institutions through 1977. No citizenship data were requested on the short form used for master's-granting institutions in 1975-77 and for doctorate-granting institutions in 1978. Data on citizenship of all full-time graduate students are available beginning in 1979 and on those enrolled part time since 1983.
- Racial/ethnic data were first requested in 1979 and became a standard item on the questionnaire in 1980.
- The support mechanisms of "fellowships and traineeships" were combined on one line until 1979, when separate data on the two mechanisms were first collected.
- "Other nonfaculty research staff with doctorates" were combined with postdoctoral appointees until 1979.
- Separate data on students receiving their primary support from the U.S. Department of Agriculture were first requested in 1985.
- Racial/ethnic data by sex were first requested in 1993 and became a standard item on the questionnaire in 1994.
- Separate data on students receiving their primary support from the National Aeronautics and Space Administration were first requested in 1996.
- A new Web-based reporting option was incorporated into the 1998 graduate student survey. Coordinators and departmental respondents both had the option of submitting their data through the World Wide Web. Using this new Web option, schools could avoid manually filling out the paper survey, and could obtain immediate feedback on their responses. This helped coordinators and departmental respondents ensure that their data was accurate and complete. Using this option also enabled respondents to upload their own data files, speeding up the reporting process.

DATA REVISIONS

During the fall 1988 survey cycle, the criteria for including departments in the survey universe were tightened, and all departments surveyed were reviewed. Those departments not primarily oriented toward granting research degrees were no longer considered to meet the definition of science and engineering. As a result of this review, it was determined that a number of departments—primarily those in the field of "Social sciences, not elsewhere classified"—were engaged in training primarily teachers, practitioners, administrators, or managers rather than researchers; these departments were deleted from the database. This process was continued during the 1989–97 survey cycles and expanded to ensure trend consistency for the entire 1975–97 period. As a result, total enrollments and social science enrollments for all years were reduced. The net effect of adjustments over the years is shown in technical table 8.

During the same period, the survey methodology changed so that the institution's highest S&E degree in the current year would apply to all previous years in which that institution was surveyed. Since a number of master's-granting institutions have become doctorate-granting institutions over the years, the result has been a smaller decrease in enrollment at doctorate-granting institutions than at master's-granting institutions. For the years 1975–76 and 1991–92, there was an increase in enrollment at doctorate-granting institutions after subsequent year modifications.

The definition of medical schools was revised during the fall 1992 survey cycle to include only those institutional components that are members of the Association of American Medical Colleges. Tables generated after the fall 1992 survey differ from their counterparts in earlier years in that they exclude schools of nursing, public health, dentistry, veterinary medicine, and other health-related disciplines; they should not be compared with tables from earlier years.